

## Ka-Band MMIC T/R Module, Phase II

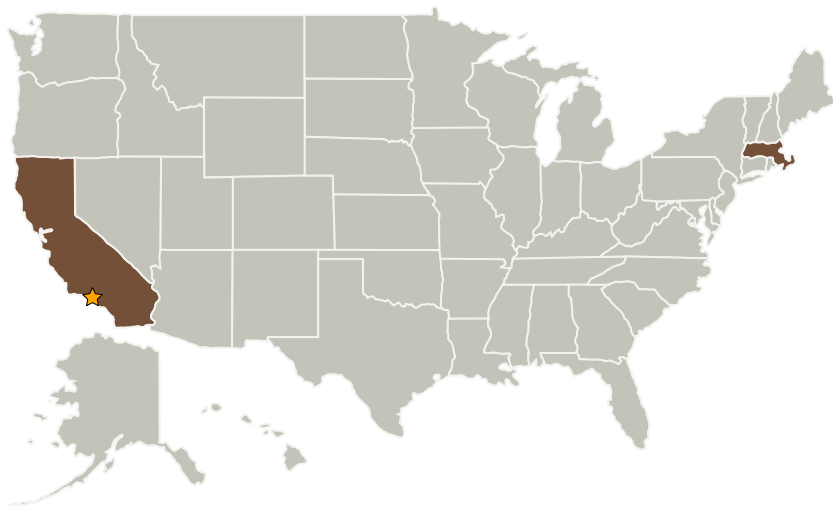
Completed Technology Project (2006 - 2008)



## Project Introduction

This Phase II proposal is presented as the follow on to the Phase I SBIR contract number NNC06CB21C entitled "Ka-band MMIC T/R Module" For active microwave surveillance of earth surface and atmosphere, radar transceivers perform functions of probing the atmosphere and the surface conditions of the earth. Radars for such applications operate in various frequency ranges depending on one or more specific needs extending all the way from UHF to millimeter-wave (MMW) frequencies. Radars today rely on phased-array antenna for beam forming and beam steering, and, in most cases today, the arrays are built with a large number of transmit-receive (T/R) modules made of amplifiers, phase shifters and duplexing switches. Microwave monolithic integrated circuits (MMIC) technology enables integration of those T/R module functions into a single MMIC chip, which, in turn allows compact implementation of phased array antennas with thousands of radiating elements. A typical T/R module consists of several circuit components that need to be optimized to achieve optimum module level performance. These components typically include a low noise amplifier (LNA), power amplifier (PA), switch, phase shifter and attenuator. This Phase II program will lead to a development of a 35 GHz T/R MMIC delivering output powers in the transmit path of 30 dBm with an associated PAE of greater than 40% and at the same time exhibiting a noise figure of less than 2.5 dB in the receive path. While beyond the specific MMIC mentioned, this Phase II SBIR will make significant contributions in MHEMT device characterization and the commercialization of MHEMT technology.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Jet Propulsion Laboratory (JPL)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Hittite Microwave Corporation	Supporting Organization	Industry	Chelmsford, Massachusetts

## Primary U.S. Work Locations

California	Massachusetts
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.2 Radio Frequency
    - └ TX05.2.7 Innovative RF Technologies